A CARDIAC REHABILITATION PROGRAM FOR MANHATTAN, KANSAS: A FEASIBILITY STUDY

by

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Introduction

Coronary heart disease, despite major advances in surgical and medical treatment, still ranks first in mortality and morbidity in the United States. Nearly half a century ago, physicians recognized the importance of early physical activity in the treatment of coronary heart disease. A program of progressive exercise begun soon after a cardiac event resulted in faster and more successful recovery. The more aggressive exercise treatment avoided the debilitating effects of bedrest and alleviated some of the psychological depression that often accompanies an acute cardiac event. An in-hospital cardiac rehabilitation program of gradually increasing levels of physical activity and education was followed in the late 1960's by an outpatient component (Certo, 1985). Today, cardiac rehabilitation consists of three phases: Phase I, an in-patient program, Phase II, an early out-patient program, and Phase III, the development of a lifelong commitment to physical activity.

Epidemiological studies suggest that certain characteristics predispose individuals to coronary heart disease. These characteristics, known as risk factors, can be divided into primary risk factors and contributing, or secondary, risk factors. Primary risk factors are those with an unquestionable role in the development of coronary heart disease (Pollock, Wilmore, & Fox, 1984) and are

divided into those which can and cannot be altered by medical treatment or lifestyle changes. Risk factors such as family history of coronary heart disease, male gender, and increasing age cannot be changed, while risk factors such as smoking, hypertension, and elevated blood cholesterol levels can be changed (American Heart Association, 1988).

Contributing risk factors are those likely associated with coronary heart disease, but still in need of additional research to support their role in the development of coronary heart disease (Pollock et al., 1984). Contributing risk factors are diabetes, obesity, sedentary lifestyle, and stress (American Heart Association, 1988). The more risk factors present in an individual, the greater the risk of coronary heart disease.

Cardiac rehabilitation programs are designed to identify risk factors present in coronary heart disease patients and develop strategies to modify changeable risk factors. Cardiac rehabilitation can also help to identify significant risk factors and reduce chances of developing coronary heart disease in otherwise healthy individuals. Thus cardiac rehabilitation programs are useful in both preventing and responding to coronary heart disease.

The mortality rate for coronary heart disease in Kansas in 1985 was 37.6% of deaths from all causes, roughly equal to the 37.0% rate for the United States. Manhattan, Kansas,

with a population of about 35,000, is located in the northeast quadrant of the state. Mortality rates for the four counties within a 20 mile radius of Manhattan ranged from 35% to 42%. These morbidity rates are likely to be underestimated because doctors are not required to report all cases of coronary heart disease. Nevertheless, existing statistics suggest that the incidence of coronary heart disease in Manhattan is still similar to the national rates. Likewise, the prevalence of various risk factors in residents of the Manhattan area are likely similar to patterns reported elsewhere. The need for cardiac rehabilitation, therefore, appears to be as great in the Manhattan area as in most other communities.

The feasibility of operating a cardiac rehabilitation program, however, depends on more than just the availability of patients needing cardiac rehabilitation. The willingness of the medical community to support a program, the availability of qualified staff to operate the program, the availability of facilities to house the program, and the availability of funds to start the program are all necessary ingredients to establishing a cardiac rehabilitation program.

The purpose of this project is to determine the feasibility of a cardiac rehabilitation program for Manhattan, Kansas, and to develop a specific plan for implementing such a program. Specifically, I will examine

the incidence of coronary heart disease in the area of Manhattan, Kansas, the development of a cardiac rehabilitation program specifically for the Manhattan area, the present status of cardiac care in the Manhattan area, and the feasibility of implementing the cardiac rehabilitation program.

The report is divided into the following sections: extent of coronary heart disease; risk factors; developing a cardiac rehabilitation program for Manhattan, Kansas; feasibility of implementing a cardiac rehabilitation program in Manhattan, Kansas; and summary and conclusions.

Extent of Coronary Heart Disease

Coronary heart disease, the major form of cardiovascular disease, is the primary cause of death and disability in the United States today. As illustrated in Table 1, coronary heart disease is responsible for over one-third of the annual deaths in the United States, in spite of a decline in the percentage of deaths due to coronary heart disease since 1960 (female deaths increased slightly and then stabilized in 1970). Coronary heart disease is also

Table 1. Deaths due to coronary heart disease (per 100,000 persons), United States, 1960-1985.*

	1960	1970	1980	1984	1985
Both sexes	369.0	362.0	336.0	323.5	323.0
Males only	439.5	422.5	368.5	345.2	342.8
Females only	300.6	304.5	305.1	303.0	304.3
% of all deaths	38.7	38.3	38.3	37.5	37.0

*Statistical Abstract of the United States 1988.

responsible for 61% of deaths from all cardiovascular/renal diseases (Moriyama, Krueger, & Stamples, 1971). The American Heart Association reported that 991,332 Americans died from all cardiovascular diseases in 1985 alone, a figure twice as large as the 407,316 Americans killed in World War II (American Heart Association, 1988).

Kansas statistics also suggest that the death rate due to coronary heart disease has declined slightly from 390 deaths per 100,000 population in 1965 to 360 deaths per 100,000 population in 1975 (Health of Kansas Chart Book, 1979). The 1985 figure stood at 338.5 deaths per 100,000 population, or 37.4%, showing a decline and percentage similar to the national average. The statistics published for Health Statistical Area II, consisting of 25 counties in the northeast part of Kansas (Appendix A), show 39.2% of all deaths due to coronary heart disease in 1975 (Health of Kansas Chart Book, 1979). Table 2 breaks down the four

Table 2. Percent of deaths from diseases of the heart in the United States, Kansas, and selected counties and cities, 1985.[1]

United States	37.00%[2]
Kansas	37.60%
Geary County	34.97%
Junction City	40.25%
Pottawatomie County	41.13%
Riley County	42.08%
Manhattan	43.18%
Wabaunsee County	35.00%

[1]Vital and Health Statistics, 1985, Vol. IIB.
[2]Statistical Abstract of the United States 1988.

counties within a 20 mile radius of Manhattan and indicates that the slightly higher than national average death rate for Health Statistical Area II in 1975 (39.2%) still holds true in 1985.

Morbidity statistics are likely to be underestimated. Nevertheless, the estimates of coronary heart disease are astonishing. The Center for Disease Control requires that certain communicable diseases be reported, but, unfortunately, coronary heart disease is not one of these diseases. The United States Department of Health and Human Services reported in 1984 that 3,599,000 persons were discharged from non-federal U.S. hospitals with a diagnosis of "diseases of the heart" of which coronary heart disease is a major part. Niccoli and Brammel (1976) stated that approximately 2,000,000 cases of coronary heart disease occur each year. The American Heart Association states that 4,870,000 Americans had major cardiovascular disease in 1985 (American Heart Association, 1988). Such startling statistics indicate the gravity of the problem of coronary heart disease and the importance of prevention and treatment in the nation, state, and local area.

Risk Factors

Given the extent of the problem, efforts are made constantly to find ways to prevent and treat coronary heart disease. Several personal characteristics called risk factors predispose individuals to development of coronary

heart disease. This section addresses the identification and modification of coronary heart disease risk factors.

Identification of risk factors

Unfortunately, establishing a causal relationship among the risk factors and coronary heart disease is difficult. We must rely on epidemiological evidence. Paffenbarger (1988) states that as long as strict principles of "statistical association, temporal sequence, consistency, persistence, independence, dose-response relationship, specificity, alterability, repeatability and confirmation of findings" are met, potential cause-effect relationships can best be assessed by epidemiological methods.

Three risk factors have been linked unquestionably to coronary heart disease: cigarette smoking, hypertension, and elevated cholesterol levels (Pollock et al., 1984). The primary factors of advanced age, male gender, family history of coronary heart disease at an early age, and the contributing factors of black race (due to a high incidence of hypertension), obesity, diabetes mellitus, emotional stress, coronary-prone (type A) personality, and sedentary lifestyle are also strongly suspected or linked epidemiologically (Pollock et al., 1984). Prevalence of certain risk factors in the population are shown in Tables 3 and 4. According to the statistics in Table 3, cigarette smoking has declined since 1970, especially in males. The American Heart Association (1985) suggests that this fact

alone may explain the reduction in coronary heart disease

Table 3. Prevalence of cigarette smoking in the United States, by sex, 1970 and 1985[1].

	1970	1985
Both sexes	36.7%	29.8%
Males only	43.2%	32.4%
Females only	30.9%	27.5%

[1]Statistical Abstract of the United States 1988.

mortality during the same time period. Stamler and Epstein (1972) published a study showing that among white males, aged 30 to 59 years, the death rate from coronary disease was 20 per 1,000 (age-adjusted rate) among non-smokers, and 60 per 1,000 among smokers of more than one pack of cigarettes per day.

Table 4 indicates that females are at greater risk than

Table 4. Prevalence of selected coronary risk factors, by race and sex, 65-74 years of age, percent of total population, 1976-80[1].

	Hypertension	High risk Cholesterol	Obesity	Sedentary[2]
White male	43.6%	13.7%	25.8%	41.2%[3]
Black male	45.2%	12.1%	26.4%	
White female	53.4%	29.9%	36.5%	52.7%[3]
Black female	76.5%	25.0%	60.8%	

[1]Vital and Health Statistics, 1987.
[2]"Never" walked one mile per week.
[3]Both races.

males from hypertension, high risk cholesterol levels, obesity, and sedentary lifestyle, and black females are particularly vulnerable to hypertension and obesity. Stamler and Epstein (1972) reported coronary death rates of 26 per 1,000 (age-adjusted rates) among white males, aged 30

to 59 years, with diastolic blood pressure below 75mm Hg, and 70 per 1,000 for the same population with diastolic blood pressure above 105mm Hg. The same authors reported a coronary death rate of 24 per 1,000 among individuals with a serum cholesterol level less than 175 mg/100 ml and 58 per 1,000 among those with a serum cholesterol level equal to or above 300 mg/100 ml. Stamler and Epstein's work supported the link between the three major risk factors and coronary heart disease.

In the United States, 25,550,000 persons (9.6% of the total population) were aged 65 years or older in 1980, and this number is expected to grow to 31,560,000 (12.6%) in 1990 (Statistical Abstract of the United States, 1988). The implications of the increasing proportion of older Americans for cardiac rehabilitation are clear. Fifty five percent of all individuals suffering acute myocardial infarction are over 65, and of those who die from acute myocardial infarction, 80% are over 65 (American Heart Association, 1988).

Modification of risk factors

Some risk factors cannot be altered by the individual (age, gender, race, family history) while others can be modified by changing lifestyle habits. Thomas, Lee, Franks, and Paffenbarger (1981) reported that the more risk factors one has, the greater the risk for coronary heart disease, and that current therapy aims to modify or eliminate risk

factors to reduce the individual's risk and to reduce overall coronary heart disease incidence.

Modification of some risk factors leads to similar changes in other risk factors. For example, altering the amount of exercise included in one's life has implications for modifying hypertension, elevated cholesterol levels, obesity, diabetes mellitus, and emotional stress.

Prior to the 1940's, patients with diagnosed coronary heart disease were severely curtailed in activity so that many patients were placed on disability. In 1940, the New York State Employment Service asked the state Heart Association to evaluate the level of activity cardiac workers could be expected to perform (Certo, 1985). Changes in treatment for the cardiac patient resulted. Early ambulation replaced prolonged bedrest. By the end of the 1960's, the combined in- and outpatient program we now recognize as cardiac rehabilitation was in place (Certo, 1985). Studies conducted using patients with diagnosed coronary heart disease (Hammond, 1985) and patients with post-operative coronary bypass surgery (LaFontaine & Brucherhoff, 1987) showed a "trend toward increased survival" (Hammond, 1985) following early intervention with aerobic exercise programs. Increased physical work capacity, reduced resting and submaximal systolic blood pressure, reduced resting and submaximal heart rates, reduced resting and submaximal myocardial oxygen work,

enhanced myocardial performance, and altered life-style (including smoking cessation, maintenance of normal weight, better sleep, reduced alcohol intake, and lowered medication requirements) were among the effects expected with chronic exercise after a cardiac event (Naughton, 1973).

Epidemiological evidence supports the advantage of regular exercise in prevention of primary (first occurrence) and secondary (recurrent) coronary heart disease. Longitudinal studies of San Francisco longshoremen (Brand, Paffenbarger, Sholtz, & Kampert, 1978), Harvard alumni (Paffenbarger, Wing, & Hyde, 1978), and London busmen (Morris, Pattison, Kagan, Gardner, & Raffle, 1966), showed that regular physical exertion provided a protective effect against primary coronary heart disease. The longshoremen and alumni studies found regular physical exertion to be protection against coronary heart disease independent of other risk factors. Recent statistics published by the United States Department of Health and Human Services indicate that only 25.8% of males and 27.2% of females aged 55-64 years, and 28.5% of males and 25.4% of females aged 65 years and over, claimed to engaged in regular exercise (Vital and Health Statistics, 1984).

Studies of London busmen (Morris et al., 1966) and San Francisco longshoremen (Paffenbarger, Brand, Scholtz, & Jung, 1978) identified elevated systolic blood pressure (longshoremen and busmen) and elevated plasma cholesterol

(busmen) as predictors of risk of coronary heart disease. Both hypertension and elevated cholesterol are reducible by regular exercise.

The San Francisco longshoremen study also identified heavy smoking as a predictor of greater risk of coronary heart disease (Paffenbarger et al., 1978). Statistics indicate that smoking increased from 1970 to 1983, and then showed a slight decrease in 1985 (Statistical Abstract of the United States, 1988). The American Heart Association (1985) suggested that the decline in smoking likely contributed heavily to the decreased mortality rates for coronary heart disease in the United States in recent years.

Developing a Cardiac Rehabilitation Program for Manhattan, Kansas

Some of the characteristics of the Manhattan, Kansas, area are first presented in this section. The characteristics were identified by conducting interviews, examining statistics, and looking at existing facilities. Based on the unique features of Manhattan, a cardiac rehabilitation program suitable for the area is presented.

Demographic characteristics

Manhattan is located in the northeast quadrant of Kansas and is the seat of government for Riley County. The population of Manhattan in 1986 was 33,750 (Manhattan Chamber of Commerce, 1988). The two largest employers in the city are Kansas State University and Fort Riley Military

Reservation. Some light industry, including Farm Bureau Insurance and McCall's Pattern Company, is also present.

Manhattan is the largest population area for fifty miles, therefore, many individuals come to Manhattan from surrounding communities for medical care. The area within a twenty mile radius of Manhattan includes numerous small towns and communities in four counties: Geary, Pottawatomie, Riley, and Wabaunsee (Appendix B). Manhattan is also part of Health Statistical Area II of the Kansas Department of Health and Environment (1979) (Appendix A).

Some demographic information for the area surrounding Manhattan is shown in Table 5. In 1986, the population of

Table 5. Population (1980 and 1986) and median age (1986, by sex) for Kansas and selected counties[1].

	Population		Median Age (years)		
	1980	1986[2]	Male	Female	Total
Kansas	2,364,236	2,461,000	28.7	31.6	30.1
Geary Co.	29,852	31,100	23.2	25.0	24.1
Pottawatomie Co.	14,782	15,600	29.3	31.5	30.4
Riley Co.	63,505	65,100[3]	22.3	23.2	22.8
Wabaunsee Co.	6,865	6,700	34.2	37.1	35.7

[1]Kansas Statistical Abstract 1986-87. [2]Projected figures.
[3]Manhattan Chamber of Commerce, 1988.

Kansas represented approximately 1% of the United States population (Kansas Statistical Abstract 1986-87). The figures in Table 5 show a slight population increase in the state and Geary, Pottawatomie, and Riley Counties, and a slight decrease in Wabaunsee County. Pottawatomie and Wabaunsee Counties are largely rural and the slightly higher

median ages (30.4 years and 35.7 years respectively) are likely due to the aging rural population staying in the area while the younger people are leaving. The median age in Geary and Riley Counties (24.1 years and 22.8 years respectively) probably reflects the large number of students and military personnel living in the area. In spite of the low median age in Riley County, Riley County still has the highest mortality rate for coronary heart disease in the area, 42.08% (Table 2, p. 5). This contrast suggests that young people are victims of coronary heart disease in Riley County.

Cardiac status

Statistics concerning coronary heart disease show mortality from coronary heart disease in Kansas, Health Statistical Area II, and the Manhattan area to be comparable or slightly higher than the United States average (see Table 2, p. 5). Additionally, the Health Systems Agency of Northeast Kansas (1981) listed coronary heart disease as the leading cause of death in Geary, Pottawatomie, Riley, and Wabaunsee Counties.

The American Heart Association (1988) stated that in 1985, the coronary heart disease morbidity rate in the United States was 4,870,000, a number which represented roughly 2% of the United States population. Morbidity, as represented by the number of patients discharged from short-stay non-federal hospitals with a diagnosis of heart disease

in 1984, was 3,599,000 for the United States, 700,000 of whom suffered acute myocardial infarction. In the North Central region of the United States, including Kansas, 970,000 had heart disease of whom 173,000 suffered acute myocardial infarction (Vital and Health Statistics, 1984). No morbidity statistics were found for Kansas or the four counties surrounding Manhattan, but there is no reason to think the incidence is any different.

Statistics regarding the important risk factors of cigarette smoking, hypertension, elevated blood cholesterol levels, and obesity for the United States are given in Tables 3 and 4 (p. 8). No statistics were found regarding the same risk factors in Kansas or the Manhattan area. Statistics on the population aged 65 and above, a group that experiences a high rate of coronary heart disease, are given in Table 6. Wabaunsee County has a higher than average

Table 6. Population of the United States, Kansas, and selected Kansas counties, aged 65 years and older, by number and percent of total population[1]

	1980 number (%)	1985[2] number (%)	1990[2] number (%)
United States[3]	25,550(9.6)	28,536(11.9)	31,560(12.6)
Kansas	306,009(12.9)	335,825(13.4)	371,976(13.9)
Geary Co.	NA	2,254 (7.4)	2,521 (8.2)
Pottawatomie Co.	NA	2,504(14.1)	2,742(12.7)
Riley Co.	NA	3,725 (5.2)	4,008 (5.2)
Wabaunsee Co.	NA	1,440(19.8)	1,574(20.4)

[1]Kansas Statistical Abstract 1986-87. [2]Projected figures. [3]Statistical Abstract of the United States 1988 (thousands).

population aged 65 and above, and Geary and Riley Counties

have a lower than average population aged 65 and above. The same tendency was noted earlier in Table 5 (p. 13) by the figures for the median age in each county.

A proposed program of cardiac rehabilitation for Manhattan, Kansas

A cardiac rehabilitation program is divided into three areas. Wilson, Edgett, and Porter (1979) described the phases in the following way. Phase I is the in-hospital phase and includes cardiac surgery, coronary artery disease-nonmyocardial infarction, post-myocardial infarction, and post-transluminal angioplasty patients. Phase I begins as soon as the patient has been stabilized and lasts until discharge from the hospital. The primary focus of Phase I is twofold: 1) gradually progressing exercise, and 2) patient and family education about the disease process, rehabilitation, and prevention of recurrence. In some programs, a low-level graded exercise test is included during Phase I at the time of discharge from the hospital. Phase II begins at discharge and lasts for eight to twelve weeks. Patients must be referred by a physician and be able to exercise at the 2.5 MET level. Phase II can take various forms depending on the facilities available: an at-home walking or stationary cycling program with periodic checks by a hospital program or physician, or a hospital- or community-facility-based structured program. Both types of programs provide a prescription of gradually progressing

exercise and continuation of the risk factor modification efforts begun in Phase I. The hospital-based or community-facility-based program offers the advantage of electrocardiographic monitoring and direct supervision, and is especially important for high-risk patients. Phase II is concluded with a symptom-limited graded exercise test. Phase III does not require the close supervision of the Phase II program. A structured Phase III program often is conducted at a community service facility (YMCA, university, community recreation building), and often includes participants who have not experienced a cardiac event but are at risk and are interested in preventing coronary heart disease. Patients enter Phase III exercising at the 5 MET level and leave the program exercising at the 8 MET level without symptoms if they are older than 55, or at the 10 MET level without symptoms if they are younger than 55. The program should be conducted three to four times a week. Activities aimed at risk factor modification should be included. An unstructured Phase III program can be an at-home walking or stationary cycling program. Phase III is expected to form the basis of a lifetime of regular physical activity (Wilson et al., 1979).

This section outlines the design of a program of cardiac rehabilitation for Manhattan using a set of guidelines for developing any health/fitness program and incorporating those characteristics unique to the Manhattan

area. The existing Phase I cardiac rehabilitation programs at Memorial Hospital and St. Mary Hospital in Manhattan are adequate with a few improvements because few cardiac patients are treated in Manhattan. Teaching will remain an individualized effort because too few patients are hospitalized at one time to warrant a regular schedule of educational classes such as those conducted at large medical centers. Memorial Hospital must revise and upgrade the charting methods used by physical therapists and nurses during its Phase I program. Each hospitals should appoint a staff member with overall supervisory authority over the program to insure thoroughness and consistency for each patient. All relevant departments in each hospital (nursing service, physical therapy, occupational therapy, dietary, social services, pharmacy) will have a voice in the development of the Phase I program.

This section deals only with developing and implementing Phase II and Phase III cardiac rehabilitation programs because the Phase I program already exists at Manhattan hospitals.

General considerations. Initiating a program of cardiac rehabilitation follows procedure similar to procedures for any health/fitness program. Stone (1987) presented a list of guidelines for development of a physical fitness program: establishing an advisory board, establishing program objectives, selecting program

personnel, establishing program admission procedures, establishing a budget, determining facility and equipment needs, establishing marketing procedures, establishing emergency procedures, and establishing procedures for keeping records and evaluating the program. Using this framework, a program of cardiac rehabilitation can be tailored to meet individual patient's needs.

Pollock et al. (1984) urged a multidimensional approach to cardiac rehabilitation, one where exercise is the main component, but where education and counseling concerning the control of associated risk factors is an integral part of the program.

Cardiac rehabilitation has as its goal the restoration of "an optimal level of physical, psychological, social, and vocational function" (Atwood & Nielsen, 1985). These programs, while most often thought of in terms of rehabilitating patients with diagnosed coronary heart disease, also encourage participation by individuals with known risk factors in an effort to avoid a major cardiac event.

The feasibility of implementing Phase II and Phase III cardiac rehabilitation programs in Manhattan depends largely on the willingness of the medical community to encourage the programs, as well as the availability of adequately trained staff, facilities, and funds. Careful planning is needed in an area with a limited population to provide a quality

program on a limited budget for a relatively small number of potential participants.

Establishing an advisory board. Wilson, Fardy, and Froelicher (1981) listed a series of questions which need to be considered during the early planning of a cardiac rehabilitation program. The questions include issues of the type of program (prevention and/or rehabilitation, exercise and/or education and counseling, "at-home" and/or structured "on-site" program), the phases of cardiac rehabilitation to include, the site of the program, the fee structure, and personnel and equipment needs. Wilson et al. (1981) suggested first setting up a steering committee within the agency interested in starting the program. In Manhattan, this group should include nurses and physical therapists from both area hospitals because these are the individuals expressing interest in out-patient cardiac rehabilitation so far. Realistically, staff from one of the hospitals may have to begin the process. The internal steering committee would assess the opinions of individuals in the community who are critical to the success of a program.

Local doctors, in contrast to the opinions of other area health professionals, do not perceive a need for a structured Phase II cardiac rehabilitation program. The doctors believe that their patients are sufficiently educated about cardiac disease, medications, risk factor modification, and exercise prescription, and are

sufficiently motivated to comply with a rehabilitation program on their own. Before starting a Manhattan program, nurses and physical therapists who have expressed an interest in cardiac rehabilitation will conduct a survey of area cardiac patients on the extent of their knowledge in all areas of cardiac rehabilitation to determine if periodic office consultation is sufficient to return patients to optimal physical, psychological, and social function, and if a more structured approach is needed. Results of a similar survey conducted at the beginning of the Phase II cardiac rehabilitation program at St. Francis Hospital and Medical Center in Topeka succeeded in convincing doctors that previous informal attempts at cardiac rehabilitation were inadequate. An individual well known to area physicians and trusted by them, such as a nurse in a local hospital intensive care unit, should be selected to present survey results to the physicians, and to assure local physicians that by referring their patients to a structured program, they are not giving up control of the patient to someone else.

An external discussion group should be formed representing the agency proposing the program and the key individuals identified from throughout the community, including physicians and hospital staff from the four county area, for the purpose of conducting a "brainstorming" meeting to exchange opinions and ideas. Individuals will be

identified from the external discussion group to make up an advisory board. The advisory board is responsible for formulating the organization, objectives and policies of the program (Stone, 1987).

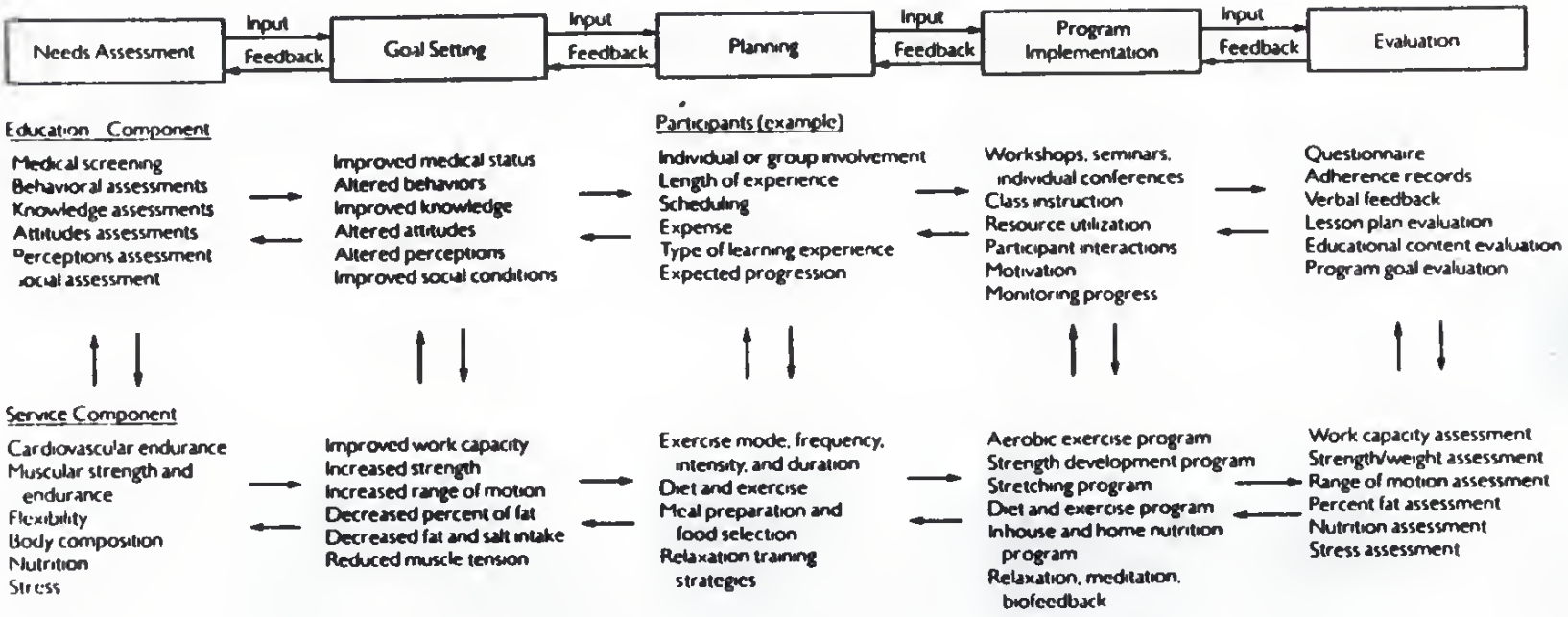
During Phase II of a cardiac rehabilitation program, patients' questions include medical status, medications, diet, activities of daily living, return to work, exercise prescription, and return to sexual activity (Pollock et al., 1984). During Phase III, patients need to know about medications, diet, stress management, habitual exercise, and signs of cardiac abnormality. Representation on the advisory board, therefore, should include a physician, nursing service (educators and cardiac rehabilitation specialists), physical therapy, occupational therapy, exercise physiology, clinical psychology, social services, vocational rehabilitation, dietary services, and pharmacology (Pollock et al., 1984).

An advisory board for the Manhattan area Phase II and Phase III programs will be formed composed of representatives of various groups in the area to be served, including physicians, nurses, physical and occupational therapists, dietitians, representatives of Kansas State University and community recreation programs, patients and their families, and public health agency representatives. The members of the advisory board will represent Manhattan and other communities in the four-county area.

The advisory board then determines the organization of the program. Patton, Corry, Gettman, and Graf (1986) presented a generic model for health/fitness programs including an education component and a service component (Figure 1). The steps in the model: are needs assessment, goal setting, planning, program implementation and evaluation in each component. A needs assessment at the beginning of the program indicates a baseline starting point for each participant, allows progress to be monitored, and provides motivation for adherence. At the time of the assessment, medical status as well as each participant's interests, attitudes and behaviors concerning the cardiac rehabilitation program are determined. Planning and program implementation follow the initial assessment with periodic evaluation throughout the course of the program.

The model allows a program to be tailored to each participant's needs. No single best way will help all participants change their lifestyles - what works for one person will not necessarily be effective for someone else. Depending on the size of the program, several approaches for meeting similar goals could be offered at once. For example, if a goal of changing dietary habits is identified, some participants may respond well to a group talk by a dietitian while others may need some follow-up individual consultation by the dietitian and/or help from a support group of fellow participants in order to implement change in

Figure 1. A generic health/fitness delivery system.*



*Patton, Corry, Gettman, and Graf (1986).

their lives. The model presented in Figure I allows for such flexibility.

Assessing results of a physical examination, medical history (including coronary status, body composition, nutritional status, and medications), risk factor analysis (including smoking, hypertension, and stress), laboratory tests (including a blood lipid profile), and graded exercise test are of primary importance in a cardiac rehabilitation program. Assessment of a patient's knowledge, attitudes and behaviors regarding exercise, smoking, diet, and stress management, and the extent of his or her family and social support is also needed. Goals and plans in both the educational and service areas of the program are then identified and implemented. Record keeping and frequent evaluation by interviews, questionnaires, or physical assessments allow the program to be modified to ensure that each participant's needs are being met.

Establishing program objectives. Practical considerations force us to consider questions of who, what, where, and when (Stone, 1987). The "who" refers to the population to be targeted by the cardiac rehabilitation program. The size of the community being served, the number of individuals who are expected to use the program, the cardiac and non-cardiac conditions the staff can handle, the adherence expectations, and the facility and equipment the program can provide will determine the size and scope of the

program (F. Pashkow, P. Pashkow, & Schafer, 1988). Wilson (1975) listed the possible participants as cardiac prone, post-infarct, post-operative, rheumatic heart disease, non-myocardial infarction, and apparently healthy high risk individuals. More recently, post-angioplasty patients can be added to the list.

Local Phase II and III programs will potentially include all cardiac patients in the four-county area around Manhattan whether they received treatment in a local hospital, in a Topeka hospital, or elsewhere. It is not reasonable to expect patients living in the Manhattan area to return to Topeka three days a week for rehabilitation. It is also not reasonable to expect each patient to have the ability and motivation to complete an exercise program with only occasional consultation with a physician during a fifteen minute office visit.

Candidates for a Phase II program include out-patients who are two to eight weeks post-myocardial infarction, heart surgery, or transluminal angioplasty, and out-patients who experience angina pectoris with exercise or ventricular dysrhythmias with or without exercise (American Heart Association, 1986). Candidates for a Phase III program include graduates of a Phase II cardiac rehabilitation program or other patients who have experienced a cardiac event within the past year, individuals having other heart disease than acute myocardial infarction or surgery and

having at least two cardiac risk factors, and asymptomatic individuals in poor physical condition who have at least three cardiac risk factors American Heart Association, 1986).

Statistics from medical records departments at local hospitals are inadequate to determine the number of potential clients for a local Phase II program because some coronary heart disease patients are admitted and treated locally, others are admitted locally and later transferred out of the area for treatment, and still others are never admitted to a local hospital but are sent directly out of the area for treatment. One Manhattan physician stated that he believed enough patients were in the area to have 10-15 participants at a time in a Phase II program, provided all the doctors treating cardiac patients in the area cooperate by referring their patients to the program.

The "what" decision of the advisory board concerns the overall and specific objectives and the scope of the program. According to Pashkow et al. (1988), the overall objective of cardiac rehabilitation is to "assist each patient to achieve optimal physical, psychological, and functional status within the limits set by the disease process". Burgess, Lerner, and Hartman (1983) stated the overall goal as returning patients to their homes, families, and jobs with optimal functional capacities restored. Niccoli and Brammel (1976) divided the goals into a quality

of life goal (returning to work, patient and family education, and maintaining psychosocial integrity) and a quantity of life goal (identifying and modifying risk factors, providing optimal treatment, and preventing future events).

Many specific goals for cardiac rehabilitation lie within these overall goals. The specific goals of a local Phase II program will be to help each patient return to activities important to his or her quality of life before illness, prepare each patient for healthy alternatives in behavior that will reduce the risk of the occurrence or recurrence of coronary heart disease, return each patient to optimal physiological function, reduce health care costs through reduced treatment time and prevention of disability, and reduce occupational losses caused by cardiovascular disease (American Heart Association, 1979). The goals of a Phase III program are maintenance of health for individuals who have never experienced a cardiac event, and prevention of a recurrent event for those with known heart disease. More specific objectives include: understanding principles of maintaining health through risk factor modification, maintaining attitudes and activities which insure cardiovascular health, maintaining optimal physiological function, learning coping strategies for stress, improving occupational performance, and reducing medical care costs by prevention of acute disease (American Heart Association,

1979).

Determining the scope of the program goes hand-in-hand with identifying goals. Before determining the scope of the program, the advisory board should conduct a survey of area health care agencies for suggestions on the proposed program and seek the cooperation and input of the area medical community and regional public agencies (Heart Association, fund-raising groups, agencies providing licensing or approval of the program) (Wilson et al., 1981).

A cardiac rehabilitation program is usually divided into three phases, and the scope of the program being developed by the advisory board can include one, two, or all three phases. The Phase I program for Manhattan has already been described. The scope of Phases II and III of the Manhattan area program will include an educational component and an exercise component. The educational component of Phases II and III will offer handout materials, videocassette materials, individual counseling, an occasional speaker, and a newsletter mailed to current and former participants. Topics will include information on cardiac function and disease, risk factor identification and modification, medications, nutrition, stress management, physical activity, and the use of leisure time (American Heart Association, 1986). The exercise component of Phase II will function three times a week for eight to twelve weeks, at a convenient time, and will include an

individualized exercise prescription based on results of a graded exercise test to be conducted by the referring physician, or a doctor's recommendation. Exercise during Phase III will continue the gradually progressing exercise prescription and is designed to promote a lifetime of physical activity.

The advisory board must decide on the "where" of the program. The decision concerning program location must be made based on the facilities available in the community being served, the size and scope of the program, and funds available. The issue of a facility will be discussed later along with determining equipment needs.

Finally, the advisory board must determine "when" to begin a program. Time must be allowed for careful planning of goals, objectives, and procedures, hiring and training of personnel, and acquisition of all the necessary equipment prior to announcing the beginning of a program. It is often advisable to start with one phase of the program and evaluate it after six to twelve months before adding additional phases (Wilson et al., 1981). Many months, and perhaps an entire year, will be required to prepare and conduct the preliminary survey and to allow important changes in attitudes among the various health professionals. Sufficient time must be taken to prepare the groundwork for the program thoroughly before launching the Phase II and Phase III programs. During that time, the Phase I portion

of the program will be in a period of upgrading.

Selecting program personnel. Overall responsibility for the cardiac rehabilitation program rests with a permanent board of directors. If the program exists as part of a hospital setting, the cardiac rehabilitation program may have a medical director who represents the program on the hospital board of directors. Pashkow et al. (1988) stated that a board of directors for an independent program should include medical professionals (physicians, nurses, cardiac rehabilitation professionals, hospital representatives), patients and their family members, and financial, publicity, and marketing representatives. The board members are crucial to the success of the program and must be chosen carefully.

The board of directors is responsible for determining qualifications and writing job descriptions for program personnel as well as hiring and training them. Patients in cardiac rehabilitation present a wide variety of needs, so a variety of staff expertise is required to oversee the exercise portion and the risk factor modification/education portion of the program. Pollock et al. (1984) suggested that staff members include a physician, nurses (educators and cardiac rehabilitation specialists), physical therapists, occupational therapists, exercise physiologist, clinical psychologist, social worker, vocational rehabilitation counselor, dietitian, and pharmacologist.

The American Heart Association (1979) stated that staff requirements will vary according to the program offered, its location, and the makeup of the patient group. Staff are expected to work under the direction of the medical director. In addition to the possible staff mentioned by Pollock et al. (1984), the American Heart Association recommended hiring recreation leaders and certified exercise technologists, exercise specialists, and program directors. All staff need cardiopulmonary resuscitation certification, and supervisory personnel should be trained and certified in advanced life support also. The American College of Sports Medicine (1986) listed competencies required for certification as an exercise test technologist, exercise specialist, or exercise program director in a rehabilitative tract. The list is extensive and includes competencies in the areas of health appraisal, testing techniques, emergency procedures, functional anatomy, exercise physiology, pathophysiology, electrocardiography, psychology and human behavior, and human development and aging. Also required for the exercise specialist is competency in exercise prescription, and required for the program director is competency in program administration (American College of Sports Medicine, 1986).

Participant adherence to the cardiac rehabilitation program is of particular interest to all staff members. Oldridge (1979) summarized a number of studies of compliance

to exercise programs for cardiac rehabilitation patients. The studies are difficult to compare because of differences in methodology, but the results show a compliance rate ranging from 13% to 81% with the majority in the 40% to 50% range. Oldridge stated that dropout by post-myocardial infarction patients from exercise programs is greater than dropout by apparently healthy exercisers. Oldridge suggested that motivation for the healthy individual is a general belief in the value of regular physical activity. The cardiac patient, on the other hand, is initially motivated to enter an exercise program by fear of another cardiac event or the recommendation of others. The patient loses the fear motive as time passes without any recurrent event, and drops out of the program. Oldridge went on to say that program design is important to compliance and that a rehabilitative program should offer not only exercise prescription, but convenient access to facilities, educational opportunities for the patient and family, opportunities for social interaction for patients and families, and continued feedback between the patient and attentive program personnel (Oldridge, 1979). Patton et al. (1986) added that important adherence techniques include strong leadership, creative programming, family and peer support, and a strong educational component. Personnel should be hired who have the qualities necessary to promote program adherence, and should be provided with continuous

training to improve their skills in this area.

Program personnel in the Manhattan area Phase II and Phase III cardiac rehabilitation program will be selected according to the above guidelines. The position of medical director will be rotated every two years among the physicians in the Manhattan area who treat cardiac patients to avoid the perception that one physician is trying to dominate the program. The coordinator of the program will be a registered nurse with training in cardiovascular disease and exercise physiology. Other members of the board of directors will include a nurse educator, physical and occupational therapist, social worker, pharmacist, dietitian, and psychologist. During each exercise session of a Phase II program, American Heart Association guidelines (1986) recommend a staff/patient ratio of 1:4 including a designated physician and at least one registered nurse with certification in Advanced Cardiac Life Support. The designated physician will be from Lafene Student Health Center on release time to assist with the cardiac rehabilitation program. Other personnel on hand to meet the staff/patient ratio requirement will be from the health fields represented on the board of directors and/or exercise physiology students volunteering in the program or fulfilling requirements for an internship. All personnel must be certified in cardiopulmonary resuscitation, and will carry liability insurance.

The recommended staff/patient ratio for the Phase III program is 1:6 to 1:10 depending on the participants' conditions and the staff qualifications. At least two staff members must be present for each session. Each staff member must be certified in cardiopulmonary resuscitation, and at least one registered nurse certified in Advanced Cardiac Life Support must be present at each session. All personnel in both phases of the program will be provided with opportunities to learn strategies to increase adherence.

Establishing program admission procedures. The Health Site Committee of the Kansas Affiliate of the American Heart Association (1986) established entry and exit criteria for each phase of a cardiac rehabilitation program. These procedures are listed below and will be adopted by the cardiac rehabilitation program in the Manhattan area.

Entry to Phase I is by admission to the hospital with diagnosed heart disease or myocardial infarction, or for heart surgery or transluminal angioplasty. Phase I ends at the time of discharge. A graded exercise test is often performed just prior to discharge.

Entry to Phase II is by physician referral and requires the ability to exercise at the 2.5 MET level. Candidates include out-patients who are post-transluminal angioplasty, or who are two to eight weeks post-myocardial infarction or heart surgery. Also included are out-patients who have frequent angina pectoris or serious ventricular arrhythmias

with or without exercise. Exercise prescription will be based on the results of a pre-discharge graded exercise test or on recommendation of the referring physician. Phase II ends when the patient can exercise at a 5 MET level without symptoms on a graded exercise test.

Entry to Phase III is by physician referral and ability to exercise at the 5-6 MET level. Candidates are in three categories: (1) cardiac rehabilitation, (2) cardiac prone, and (3) preventive. Cardiac rehabilitation patients are individuals who have completed Phase II, have been diagnosed as having myocardial infarction, heart surgery or transluminal angioplasty within the past year, or have elicited an ischemic response on a graded exercise test. Cardiac prone individuals are those with diagnosed heart disease but not meeting the criteria for cardiac rehabilitation and with two or more major cardiac risk factors. Individuals in the preventive category are between 35 and 65 years of age, in poor physical condition, and at risk for heart disease due to the presence of three or more major cardiac risk factors requiring modification. Exit criteria from Phase III are the ability to exercise at the 8 MET level without symptoms if older than 55, ability to exercise at the 10 MET level without symptoms if younger than 55, or, if unable to meet the exercise requirements, physicians approval.

An informed consent form, signed after an explanation

by a staff member, must be completed prior to entry to Phase II or Phase III.

Establishing a budget. Wilson et al. (1981) stated that the "ultimate success of a program depends on a well-developed and well-administered budget". The budget is a tool which lists projected annual costs and the resources available to meet those costs (Pashkow et. al., 1988). Costs include capital expenditures (facility acquisition/ maintenance and major equipment purchases) and operating costs (salaries, clerical supplies, postage, phones, and other ongoing expenses) (Stone, 1987). In addition are the cost of liability insurance, overhead, and staff professional advancement (travel to conferences, subscriptions to professional journals, visits to other programs, or books) (Wilson et al., 1981). Pyfer and Doane (1973) suggested including $5,000 in the budget to cover a first year deficit.

Revenues usually come from fees charged for exercise sessions, but revenue can be obtained also by charging for behavior modification classes or seminars and for exercise testing (Wilson et al., 1981). Appeals to various service clubs (Rotary, Sertoma, and others) and applications for grant money can provide revenue (Pashkow et al., 1988).

The main source of revenue in the Manhattan programs will come from third-party payments. If the guidelines of the American Heart Association (1986) are met, Medicare and

other insurance companies pay at least 80% of the $10-$15 per session fee. Phase III will be on a self-pay basis, and it is hoped that the cost can be kept to $3-$5 per session.

A grant proposal will be submitted to pay for part of the program because participants can be used as subjects in a research study on some aspect of the effects of exercise on coronary heart disease conducted by faculty and students at Kansas State University. Area service organizations will be contacted for donations to be used for equipment purchases. Commercial space rental in Manhattan currently costs $5-$7 per square foot of space per year with the tenant paying for utilities, taxes, and interior maintenance. By holding the program at Kansas State University facilities, this expense will be reduced. Expenditures will also include equipment needs, liability insurance, clerical supplies, and salaries.

Determining facility and equipment needs. Initial equipment expenditures can be substantial. The current Creative Health Products (1988) discount price list shows an arm ergometer selling for $775.00, exercise cycle ergometers for $449-$680, rowing machines for $219-$249, and treadmills for $2500-$3400. In addition, medical equipment (monitor/defibrillator, blood pressure cuffs and stethoscopes, and emergency supplies for the crash cart) will be required. Depending on the size of the program, several pieces of exercise equipment may be needed. Careful

thought must be given to the needs and existing resources of the program. Borrowing equipment from a hospital or fitness center or buying second hand equipment may be possible, but it still represents a sizeable expenditure.

A Phase I program requires little space, taking place primarily in the patient's hospital room and the hallway. Phase II and Phase III programs require considerably more space to house a variety of activities and accommodate a number of participants at one time (Wilson et al., 1981). A careful search in the community may reveal some space available in a hospital or other building that could be used to house a cardiac rehabilitation program. The cost of building a new facility or renovating an existing facility could be prohibitive. Sufficient space must be available to allow for safety while exercising. Staff must be able to see patients exercising at all times, and adequate lighting is essential. There must be classroom, office, and storage space. Participants must have easy access to parking, rest rooms, changing rooms, drinking water, and phones (Pashkow et al., 1988).

The facility used for the Manhattan Phase II program will be the exercise physiology area at Kansas State University to avoid patient dependence on the hospital, and to share some of the equipment used for teaching purposes and the expertise available at the University. A secure locked area is needed for emergency medical supplies. An

agreement between the program and the University will be reached in which the University provides the program with student intern helpers, the use of exercise equipment, and space, and the program purchases some additional exercise equipment to be used by both program participants and University classes. The equipment needed for each session of 10-15 participants is as follows: defibrillator/monitor (borrowed from a local hospital), emergency supply cart (including suction machine, medications, and written emergency protocols), blood pressure cuffs and stethoscopes, arm ergometer, three or more cycle ergometers, and three treadmills.

Phase III of cardiac rehabilitation in the Manhattan area will be operated as a part of the Ahearn Fitness Program already in effect at Kansas State University on a self-pay basis. Current cost to participate in structured activities in the Ahearn Fitness Program is $29.00 per year. The fee for a cardiac rehabilitation program will be higher than that because, in addition to adult fitness staff, cardiac rehabilitation staff will be present at all exercise sessions and observe all cardiac rehabilitation patients, but every effort will be made to keep it as low as possible. The necessary equipment for monitoring and for emergencies is the same as for the Phase II program.

Establishing marketing procedures. A number of different people in the community must be convinced of the

need for a cardiac rehabilitation program. Each requires a different strategy. The medical professionals in the community may need to see results of a survey of similar programs offered and a listing of the reasons this program is needed, or a survey of cardiac patients in the area and the extent to which their needs are (or are not) being met. This approach will be needed in the Manhattan area because local physicians feel that their patients' needs are being met by an occasional visit to the office.

Fardy (1979) suggests that Phase I and Phase II aspects of the program are best made known to the medical community because the program will depend on their referrals for survival. Advertising such programs directly to the public is ethically suspect. Including a program of primary prevention for apparently healthy adults along with the Phase III program will help sell the program to the public and should be strongly considered (Fardy, 1979). Developing a brochure explaining the program, or holding an "Open House" to introduce the program are possible marketing techniques (Wilson et al., 1979).

Marketing of a Phase II cardiac rehabilitation program will involve informing the medical community in the four-county Manhattan area to obtain the needed referrals to the program. Encouraging local physicians to issue standing orders for referral to the Phase II program at the time of hospital discharge will facilitate referrals to the program.

Physicians in outlying areas will be notified of the existence of the Phase II program so that patients from the local area under their care will be encouraged to attend.

Phase III will be advertised throughout the communities in the area in conjunction with the Kansas State University adult fitness program to inform the public. Brochures will be distributed to local offices and businesses.

Establishing emergency procedures. VanCamp and Peterson (1986) surveyed 167 cardiac rehabilitation programs and learned the incidence of major cardiovascular complications in out-patient cardiac rehabilitation programs. The incidence per million patient hours were 8.9 cardiac arrests, 3.4 myocardial infarctions, and 1.3 fatalities. VanCamp and Peterson concluded that properly prescribed and supervised cardiac rehabilitation carried little risk. In the Guidelines for Cardiac Rehabilitation Programs (1986), the Kansas Affiliate of the American Heart Association described the staff whose presence is needed during each phase and the qualifications each must possess. All staff must be certified in cardiopulmonary resuscitation and have completed an orientation course in cardiac rehabilitation. During Phase I, a physician and a registered nurse with critical care training in cardiovascular diseases must be present at each session. During Phase II, a physician must be available in the building (and able to reach the site within four minutes)

and at least one registered nurse with critical care training in cardiovascular diseases and authority to implement emergency medical protocols must be present at each session. During Phase III, at least two staff members must be present at each session, at least one of whom must be a registered nurse with critical care training in cardiovascular diseases and authority to implement emergency medical protocols.

The American Heart Association (1987) described the protocol to be used in a number of cardiac emergencies in The Textbook of Advanced Cardiac Life Support. A copy of each protocol should be on the emergency cart. The same textbook listed the emergency equipment and supplies that should be on the cart. Each staff member should be familiar with the cart and its contents. The contents of the emergency cart should be checked regularly to insure that everything is ready at all times. Emergency drills should be conducted periodically to familiarize the staff with their respective roles in a real emergency (Pachkow et al., 1988).

Plans must also be made in case litigation is brought against the program. Parr and Kerr (1975) reported that all personnel involved in cardiac rehabilitation programs hold themselves out to the public as specialists in a rapidly changing field, and must be covered by liability insurance. The American College of Sports Medicine, several

professional nursing groups, and other professional organizations offer liability insurance. Every effort must be made to insure that informed consent forms are fully explained before being signed and that a patient's right to privacy is maintained (Parr & Kerr, 1975).

Protocols for dealing with cardiac emergencies published in the Textbook of Advanced Cardiac Life Support (American Heart Association, 1987) will be adopted and standing orders for their use issued by the medical director of the Phase II and Phase III programs in Manhattan. Copies of each of the protocols will be kept with the emergency cart. During each Phase II and Phase III session, staffing requirements outlined by the American Heart Association (1986) will be followed. Liability insurance to meet legal emergencies will be carried by the program and by each staff member.

Establishing means for keeping records and evaluating the program. Keeping careful records of a cardiac rehabilitation program is necessary for insurance reimbursement, statistical and financial data, program feedback, and many other reasons. Pashkow et al. (1988) suggested that records be kept concerning the overall program (purpose, philosophy, policies, budgets, program procedures), the staff (meeting minutes, personnel policies, job descriptions, employment records), the daily program (calendar, staff schedule, staff roster, patient roster,

list of physicians, log/attendance sheets, exercise prescriptions, schedule of educational sessions, supply of forms), and the patients (admission information, current and previous records, referral and current physician orders, discharge summaries).

From the patient's point of view, record keeping documents the effectiveness of his or her efforts in the program and may stimulate better adherence. In addition, participants are motivated to come to class if they know attendance records are kept (Patton et al.,1986).

Careful record keeping allows the program to be evaluated after some time has passed. Information learned from reviewing records allows the program directors to reassess the goals and overall effectiveness of the program or perform a cost/benefit analysis.

Each patient in both phases of the Manhattan cardiac rehabilitation program will have a chart in which is kept medical history and records, the signed informed consent, and a record of each session attended including resting heart rate and blood pressure, exercise heart rate and blood pressure, mode of exercise and workload, duration of exercise, maximum target heart rate, and observations by the patient and staff (American Heart Association, 1986).

Program records for both phases of the Manhattan program will include information concerning the overall program, the staff, the daily program, and the patients as

outlined above. During the first year of operation, an evaluation will be made at the end of six months and one year. Staff and board of directors will try to assess the effectiveness and efficiency of the program by examining patient progress in both the exercise and education areas, and by the ability to operate within the projected budget.

This three-phase cardiac rehabilitation program conducted in cooperation with Kansas State University is designed to serve the small number of patients in the area needing the program and utilize the expertise available in the community.

Feasibility of Implementing a Cardiac Rehabilitation Program in Manhattan, Kansas

Current status of cardiac rehabilitation in Manhattan, Kansas

The following description of cardiac rehabilitation in the Manhattan area was compiled through interviews with a representative of each of two groups of physicians, four nurses, three physical therapists, and two hospital medical records department staff members in Manhattan, and with the coordinators of cardiac rehabilitation at Stormont-Vail Regional Medical Center and St. Francis Hospital and Medical Center in Topeka. Manhattan is serviced by two acute care hospitals. Memorial Hospital has 65 beds and St. Mary Hospital has 95 beds. Hospitals in the four county area surrounding Manhattan are listed in Table 7.

No physician with a specialty in cardiology presently

Table 7. Hospitals located in selected Kansas counties, by size[1].

City	County	Hospital	Beds
Junction City	Geary	Geary Community	92
Westmoreland	Pottawatomie	Community Hospital, Onaga Inc.	25
Wamego	Pottawatomie	Wamego City	26
Manhattan	Riley	Memorial	65[2]
Manhattan	Riley	St. Mary	95[2]
	Wabaunsee	none	

[1]Health Systems Agency of Northeast Kansas (1981).
[2]Personal communication, representative of hospital.

practices in the Manhattan area. Three groups of Manhattan physicians include internists in their practice, and the internists care for the coronary heart disease patients. If a coronary heart disease patient requires hospitalization, the doctor must decide to admit the patient to a local hospital for treatment, or send the patient to a larger medical facility, usually 50 miles away in Topeka. In 1987, ten patients with a primary diagnosis of acute myocardial infarction were treated at Memorial Hospital. In 1987, 48 patients with a primary diagnosis of acute myocardial infarction were treated at St. Mary Hospital, and five patients suffered an acute myocardial infarction while already hospitalized there. It could not be determined if all of the acute myocardial infarction patients admitted to either Manhattan hospital remained there for the full extent of their treatment. Some may have been stabilized and transferred out for further care. The number of patients

who go directly to a larger medical facility for care without being admitted to a Manhattan hospital is also impossible to estimate. Determining accurately the extent of coronary heart disease in the immediate area is, therefore, extremely difficult. According to one of the physicians interviewed, the "great majority" of coronary heart disease patients are sent for treatment to either Stormont-Vail Regional Medical Center or St. Francis Hospital and Medical Center in Topeka. Both Topeka hospitals have active, highly organized Phase I and Phase II cardiac rehabilitation programs within their respective departments of cardiology. Stormont-Vail offers a Regional Cardiac Monitoring Program which helps monitor patients hospitalized in the two community hospitals in Pottawatomie County. St. Francis Hospital offers a Phase III cardiac rehabilitation program for their Phase II patients who wish to continue rehabilitation at the hospital on a self-pay basis.

Memorial Hospital and St. Mary Hospital in Manhattan both offer Phase I of cardiac rehabilitation to their patients. Both programs provide the patients with an educational American Heart Association book, Heart Attack: What's Ahead?. The book describes the heart, heart attack, treatments, expectations during recovery, and risk factor modification. Both Manhattan hospitals use the same seven-step program implemented by physical therapists and nurses

for progressively increasing physical activity in the hospital (Appendix C).

At Memorial Hospital, nurses are responsible for teaching patients about their disease, treatment, recovery, and risk factor modification. A simple form on the patient's chart allows recording of the teaching content. A four-page handout designed for use after discharge describes energy conservation in daily activities, a gradual increase in physical activities, and some signs of stress during activity. The social worker and dietitian are called in as needed. At the present time, the physical therapy department is considering starting a Phase II cardiac rehabilitation program. So far, they have only talked about a program among themselves, so are unsure of how the program would take shape, the attitudes in the medical community toward cardiac rehabilitation, or the fate of previous attempts to develop a Phase II program. Memorial Hospital will soon begin building an addition to the hospital in which some space is not yet designated for a particular use. The physical therapists look on the new space as a possible site for their program, but hope to identify other possible sites in the community as well.

At St. Mary Hospital, efforts at cardiac rehabilitation seem more organized than at Memorial Hospital. The physical therapist and the Intensive Care Unit nurse interviewed referred to themselves as the "cardiac rehabilitation team".

Intensive Care Unit nurses are responsible for patient teaching even after the patients are removed from Intensive Care to the medical floor. Physical therapy, pharmacy, dietary, and social service departments are automatically notified of the presence of a cardiac rehabilitation patient. The physical therapy department places a form on the patient's chart listing the purpose and objectives of its teaching program, an initial evaluation of the patient's knowledge, and a record of each of the teaching competencies. The areas taught by the physical therapists include taking heart rate, understanding the response of heart rate to physical activity, compliance with the rehabilitation program, and a home exercise program. A nursing service teaching form on the chart includes the purpose and objectives of teaching, an initial evaluation of the patient's knowledge, and an elaborate post-teaching evaluation of the patient's knowledge in the areas of basic heart function, atherosclerosis as a precursor of coronary artery disease, angina, myocardial infarction, and risk factor modification. A four-page handout describes activity at home, a prescribed home walking program and a chart for recording daily exercise. Patients view three videocassettes during hospitalization, one each on hypertension, stress and tension, and myocardial infarction and cardiac rehabilitation. At the time of discharge, patients are invited to join the Cardiac Therapy Group, a

support group of post-myocardial infarction patients who meet informally every other week at the hospital, sponsored by the social services department. Occasionally a speaker is featured at a meeting, and some members of the group exercise together at an enclosed shopping mall or in Weber Arena on the Kansas State University campus.

One Manhattan physician estimates that there are enough coronary heart disease patients in the area to have 10-15 participants at a time in a Phase II program[1]. The physician felt that his patients comply well with exercise even without a structured program, but that there is a place for a structured program, especially for those patients who are initially afraid to exercise. The physician also felt that having a Phase II or Phase III program housed in a hospital leads patients to become dependent on the hospital. He would like to see a Phase II program started at Kansas State University using the expertise of some of the exercise physiologists and students there, fulfilling the requirement for a physician's presence by hiring or obtaining release time for a physician from Lafene Student Health Center. The physician also felt a Phase III program must keep costs to the patient to $2-$5 per session. Health insurance will not pay for Phase III rehabilitation, so the cost to the patient must be low.

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[1]Physicians and other medical specialists interviewed asked to remain anonymous.

The representative of the second group of physicians in Manhattan favors cardiac rehabilitation, but does not feel a structured program is needed. The physicians feel the goal is to return a patient to work, and the biggest factor in compliance with an exercise prescription is the motivation to return to work. If the patient was happy in a job before the cardiac event, he or she will be willing to do whatever is necessary to return to the job. The physicians in this group feel their patients comply very well. The physical therapists and nurses at the Manhattan hospitals do not believe patients are as compliant as the physicians think, and the literature on adherence would agree with the physical therapists and nurses. Several studies (Andrew et al., 1981; Andrew & Parker, 1979; Oldridge, 1979) reported only a 40%-50% rate of adherence to exercise in cardiac patients.

A serious lack of communication among the various phases of the medical community was evident from my interviews. Memorial Hospital and St. Mary Hospital have been in hostile conflict with one another for a number of years. Therefore, the nurses and physical therapists at the two hospitals seemed unaware that they were using the same American Heart Association book (Heart Attack: What's Ahead?) and the same seven-step progressive exercise plan for their respective Phase I programs. Memorial Hospital staff were unaware of the efforts by St. Mary Hospital staff

to develop an outpatient program ten years ago. The physicians interviewed seemed not to have talked to one another about cardiac rehabilitation in general or about previous attempts to implement Phase II programs in particular, because they were unable to say for sure how other physicians in town felt about the issue. And finally, staff at both hospitals were unaware of opportunities for the public to exercise that are available at Kansas State University facilities like Ahearn Fieldhouse and the Chester Peters Recreational Complex.

Previous attempts to set up cardiac rehabilitation programs

The physical therapy and nursing departments at St. Mary Hospital tried to introduce a Phase II program "about 10 years ago". The program was unsuccessful because of a lack of physician support. A fitness trail has been built more recently on the hospital grounds and the hospital helps sponsor "Mall Walkers", a group designed to encourage anyone, not just cardiac patients, to engage in regular physical activity in an enclosed shopping mall. There is presently no space in the hospital for a Phase II or Phase III program.

In 1985-1986, a Phase II cardiac rehabilitation program was initiated in Manhattan by Dr. James D. Gardner in cooperation with the Kansas State University Department of Physical Education and Leisure Studies. A non-profit organization, the Manhattan Health Connection, was formed to

procure liability insurance. A registered nurse/exercise physiology student was hired to lead the exercise. The program was conducted three mornings a week at 6:00AM in the gymnasium at Ahearn Fieldhouse. Patients in the program had to be referred to the program by their physician and be within six months of their coronary event in order to qualify for third party coverage. Patients had a graded exercise test before entering the program, and a body composition assessment upon entering. The exercise leader developed a walk/jog program, and taught the patients about taking pulses, target heart rates, and ratings of perceived exertion. At each session, the exercise leader took blood pressures and monitored cardiac rhythms with the paddles on the defibrillator. Emergency plans included having on the site a defibrillator and emergency drug box borrowed before each session from Memorial Hospital, and notifying the ambulance service of their location before each session. In addition, a physician was present for each session. The exercise leader did some individual teaching at each session while she exercised with the patients. The program lasted only eight or nine months and had a total of four participants, all Dr. Gardner's patients. Lack of referrals from the doctors here or in Topeka helped doom the program. (According to the cardiac rehabilitation coordinators in Topeka, Topeka physicians are reluctant to refer patients directly to a program over which they have no control.

Topeka physicians would rather refer patients back to their Manhattan physician and have the Manhattan physician refer the patient to a local cardiac rehabilitation program.)

The preceding discussion of cardiac care presently in the Manhattan area and previous attempts to introduce structured cardiac rehabilitation programs indicates the formidable obstacles to implementing such a program in the area. Therefore, even though the need for cardiac rehabilitation can be demonstrated, and the facilities and staff are available, the lack of an attitude of acceptance and cooperation within the medical community makes the feasibility of implementing a structured program remote.

Summary and Conclusion

Coronary heart disease is the primary cause of disease and death in the United States, including the state of Kansas and the area surrounding Manhattan. Since the 1950's, physicians have advocated an aggressive treatment program consisting of gradually increasing amounts of physical activity beginning as soon as the cardiac condition has stabilized, usually within one to three days after a cardiac event or surgery. The goal of cardiac rehabilitation is to return a patient to optimal physiological, psychological, and functional status within the limits of the disease (Pashkow et al., 1988). The purpose of this report is to determine the feasibility of a cardiac program for Manhattan, Kansas and to develop a

specific plan for implementing such a program.

Cardiac rehabilitation programs are divided into three parts: Phase I begins in the hospital as soon as the patient is in a stable condition and lasts until discharge, usually ten to fourteen days; Phase II begins one week after discharge and lasts eight to twelve weeks; Phase III follows Phase II and is designed to become a habitual part of an individual's lifestyle. All three phases consist of an exercise component prescribed to meet each individual's need for gradually increasing amounts of physical activity, and an educational component which teaches about cardiac function and disease, treatment and medications, expectations during recovery, identification and modification of coronary risk factors (especially cigarette smoking, hypertension, high cholesterol levels, and sedentary lifestyle). The American Heart Association (1986) published guidelines to follow in the development of cardiac rehabilitation programs.

The needs of each community must be clearly identified so that cardiac rehabilitation programs may be tailored to meet those specific needs. Manhattan, Kansas, is a small city (population of 33,750 in 1986), surrounded in a 20-mile radius by a number of smaller communities in four counties. Statistics indicate that mortality and morbidity rates from coronary heart disease and incidence of coronary risk factors are similar to levels experienced in the state and

in the nation.

Two small hospitals are located in Manhattan, and three other small hospitals are in the surrounding area. No cardiologist presently practices in the area, so the great majority of coronary heart disease patients are transported 50 miles to Topeka for treatment. Both Manhattan hospitals offer Phase I cardiac rehabilitation to patients treated for coronary heart disease locally, and patients sent to Topeka for treatment receive Phase I cardiac rehabilitation there. The Topeka area offers Phase II and Phase III programs also, but it is unreasonable to expect Manhattan patients to travel so far several times a week for exercise. This report concentrates on Phase II and Phase III because Phase I is already offered.

No Phase II or Phase III cardiac rehabilitation presently exists in Manhattan. Attempts to implement Phase II programs have failed in the past because of a lack of encouragement by area physicians. Interviews with physicians revealed that they do not feel the need for a structured Phase II or Phase III program. The physicians say they are able to teach their patients well enough and monitor their exercise during office visits. The physicians also believe that their patients comply well with exercise prescriptions. Nurses and physical therapists disagreed with the physicians' assessment about the patients' knowledge and compliance with exercise. The nurses and

physical therapists interviewed believe there is a need for structured Phase II and III cardiac rehabilitation in Manhattan. The first step in the development of a cardiac rehabilitation program for Manhattan is to conduct a survey of patient knowledge and compliance with exercise to determine if fifteen minutes of consultation during an office visit is sufficient for rehabilitation of cardiac patients.

The two hospitals in Manhattan are in unfriendly competition with one another making a cooperative effort to develop cardiac rehabilitation difficult. A Manhattan physician estimated that only ten to fifteen area patients would qualify for a Phase II cardiac rehabilitation program at any given time. This small number of patients requires only one program in the area, so cooperation among the medical community is necessary.

Proposals for Phase II and Phase III programs are presented for the Manhattan area. Both programs are developed according to the guidelines outlined by Stone (1987), and both meet the standards determined by the American Heart Association (1986) for cardiac rehabilitation.

A Phase II cardiac rehabilitation program is proposed in cooperation with the Department of Physical Education and Leisure Studies at Kansas State University. A cooperative effort allows the program to use the facilities, equipment,

and expertise of faculty and students in exercise physiology. In return, the program would purchase additional equipment for joint use by the program and the university. Grant money could be obtained to help pay for some equipment if patients could serve as subjects in research conducted by faculty and students. A physician, whose presence is required at all sessions for Phase II, would come from Lafene Student Health Center on release time provided by the university.

A proposed Phase III cardiac rehabilitation program would be conducted in conjunction with the adult fitness program already offered at Ahearn Fieldhouse at Kansas State University. Again, this cooperative effort presents advantages to the program and the university. The Phase II and Phase III programs offered meet the needs of the Manhattan area.

Considering feasibility, many hurdles must be faced in order to implement a three phase program of cardiac rehabilitation in Manhattan, Kansas. Because of the population of the area, the program must necessarily be small, so planning must be done carefully. The major problem to be overcome is the attitude and lack of cooperation of the medical community - the physicians and the administration and staff of the two hospitals. Realistically, these are difficult problems and it will take the concentrated efforts of an individual who is known to

the medical and hospital communities and who has their support and confidence to begin to solve them. The alternative is unacceptable. The program is needed because cardiac patients are not presently being well served in the Manhattan area.

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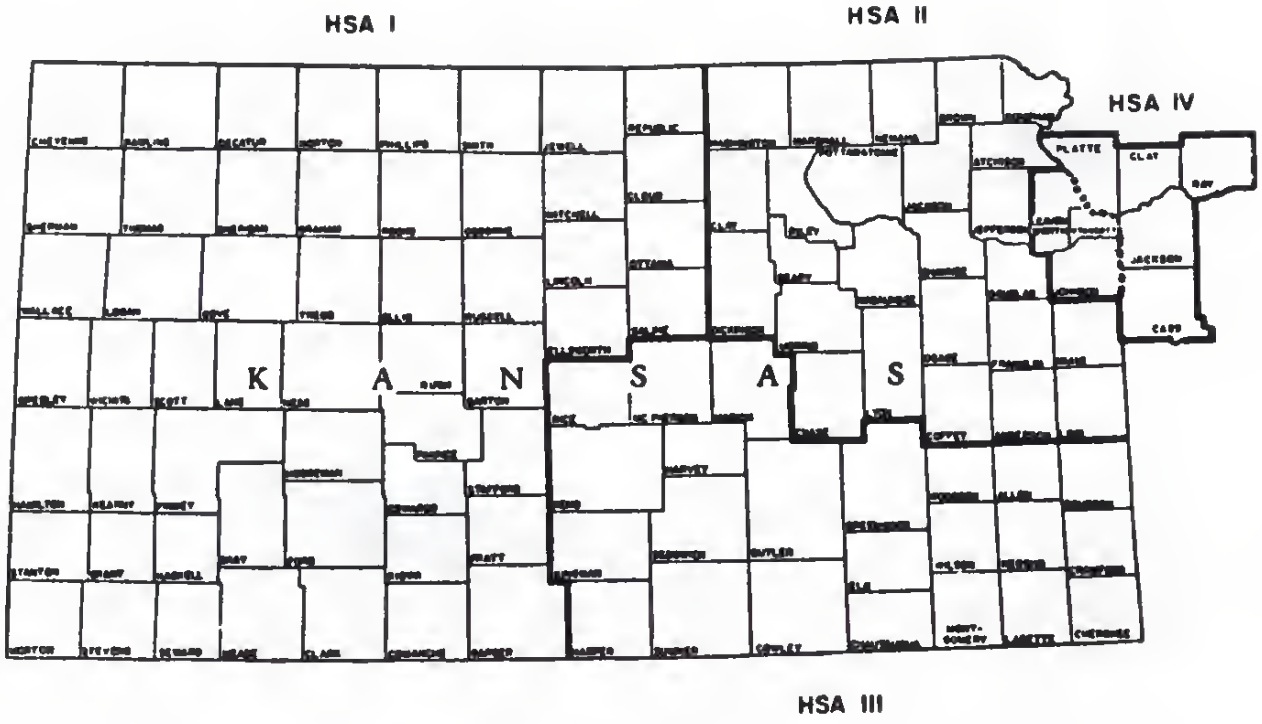
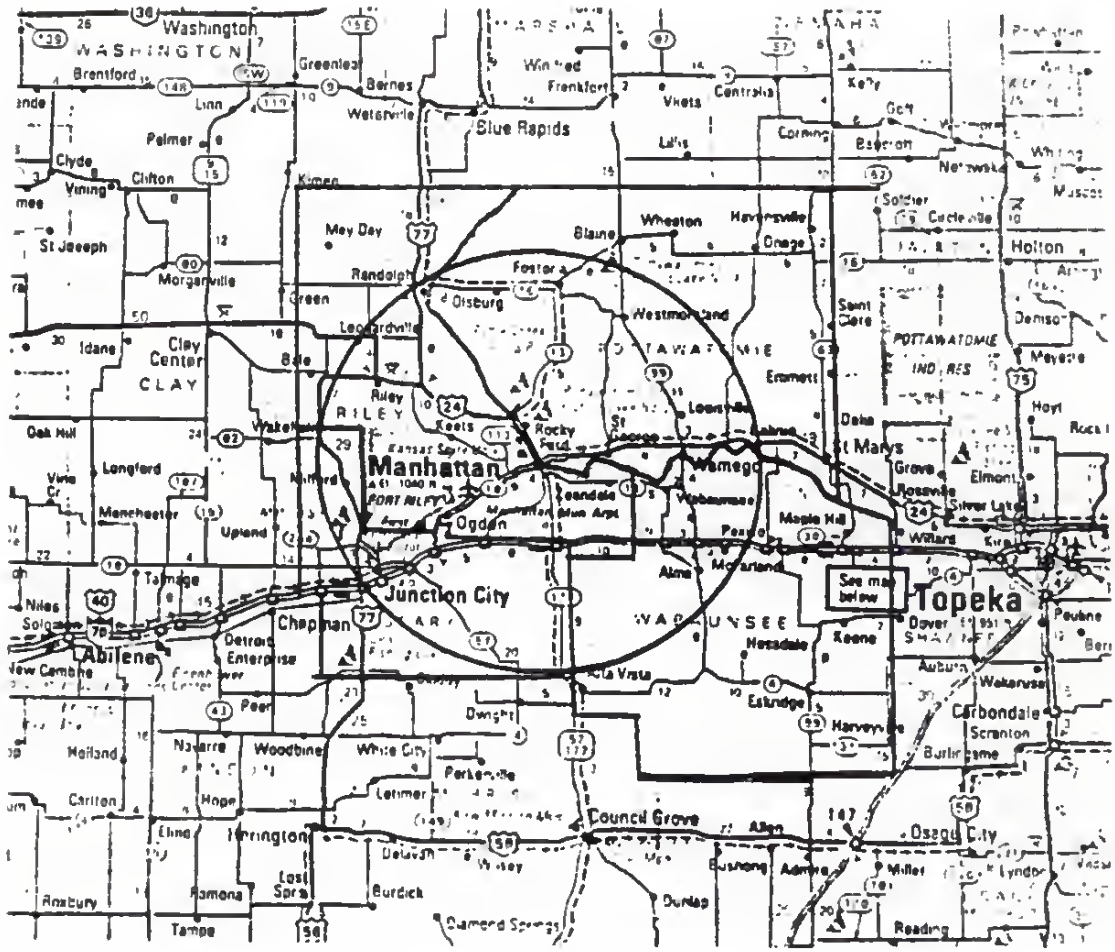
Health Statistical Areas*



*Health of Kansas Chart Book, 1979.

APPENDIX B

Kansas Counties Within a Twenty Mile Radius of Manhattan



APPENDIX C

INPATIENT CARDIAC REHABILITATION PROGRAM

NAME_____ ROOM_____ DR._____

RECOMMENDED MAXIMUM PULSE RATE_____

TAGE	DOCTOR'S INITIALS DATE & COMMENTS	P.T. AND O.T. ACTIVITY	NURSING UNIT ACTIVITIES
		Passive ROM to all four extremities bid by P.T. Initial interview and orientation to O.T. Program.	CCU - washing own hands and face. Moving in bed to position of comfort. Feeding self if able. Up to commode with assistance. Head of bed elevated if desired.
		Active ROM with all extremities 5x each BID. Supervised by P.T. Light O.T. activity	Combing hair, brushing teeth, shaving. Coughing&Deep breathing every 2 hours while awake.
		Continue same exercises. Allowing patient to do exercises on own. "In lap" O.T. activity - hand and forearm only.	Up in chair 20-30 min BID. BR with assist if in room or bed is next to BR. Read & watch TV. Eat meals at bedside. Visitors limited to family and close friends for brief periods.
		Weights or resistance may be added to the leg exercises. Begin instruction in work simplification. O.T. as in Stage 3 + gradual approach + increased activity.	BRP unassisted. Up in chair TID for 30 minutes. May walk in room for 1 minute periods BID. Continue with same self care.
		Walk in hallways with PT using pulse rate as guideline. Add some standing exercises if tolerated. Continue with instruction in work simplification & graded activity in OT. Bilateral arm and shoulder activity.	May stand to shave in bathroom. Up in chair ad lib as tolerated.
		Start on home instructions. Increase walking distance and speed. O.T.: planning for discharge, Activity graded to light lifting and bilateral arm and trunk motion. Stairs before discharge: Yes___ No___	Walk to shower. Get hair fixed. Visitations at discretion of patient.
		Patient discharged to home. 1. Continue exercises as started in hospital. 2. Increase walking distance to 3 miles as tolerated. 3. Will be given form to record daily activity and problems, if any. 4. This stage should be approx. 8 weeks.	

A CARDIAC REHABILITATION PROGRAM FOR MANHATTAN, KANSAS: A FEASIBILITY STUDY

by

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B.S.N., Catholic University of America, 1964

AN ABSTRACT OF A REPORT

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requirements for the degree

MASTER OF SCIENCE

Department of Physical Education and Leisure Studies

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ABSTRACT

Coronary heart disease is the primary cause of disease and death in the United States. In recent decades, treatment of coronary heart disease has consisted of gradually progressing amounts of physical activity begun as soon as the cardiac condition has stabilized, usually within one to three days. The purpose of this study is to determine the feasibility of implementing a program of cardiac rehabilitation in Manhattan, Kansas, and to propose a specific plan to implement the program.

The primary goal of cardiac rehabilitation is to return the coronary heart disease patient to optimal physiological, psychological, and functional status. The secondary goal is to prevent coronary heart disease in the individual with significant cardiac risk factors. Cardiac rehabilitation programs are divided into three parts: Phase I begins in the hospital and lasts until discharge (usually ten to fourteen days); Phase II begins one week after discharge and lasts eight to twelve weeks; Phase III follows Phase II and is designed to become a habitual part of an individual's lifestyle. All phases consist of an exercise component and an educational component. In the exercise component, the individual follows an exercise prescription of gradually increasing intensity based on the results of a graded exercise test. In the educational component, the individual learns about cardiac function and disease, treatment and medications, expectations during recovery, and the

importance of modifying risk factors (cigarette smoking, hypertension, high cholesterol levels, sedentary lifestyle). The American Heart Association has developed guidelines to follow in a cardiac rehabilitation program.

Presently, the two small hospitals in Manhattan offer a Phase I program to their patients. The majority of residents within a twenty mile radius of Manhattan are sent fifty miles away to a large medical center for treatment of coronary heart disease and participate in Phase I cardiac rehabilitation there.

Physicians in Manhattan offer advice about physical activity to their patients during return office visits and, contrary to the beliefs of other health professionals in the area, do not feel that structured Phase II or Phase III programs are needed in Manhattan. The two hospitals in Manhattan are in unfriendly competition with each other, and cooperation in a single program, essential because of the small number of potential patients, currently seems unlikely.

The feasibility of implementing cardiac rehabilitation in Manhattan, Kansas, was found to be unrealistic at this time due to the lack of enthusiasm of local physicians, the lack of cooperation between the hospitals, and the lack of communication among members of the medical community. As a result of these findings, it was concluded that an individual well known and trusted by the members of the medical community would be in the best position to convince

area physicians of the importance of a structured cardiac rehabilitation program.